Guidance

Curriculum and Standards

Pedagogy and Practice: Teaching and Learning in Secondary Schools

Unit 8: Explaining

Senior leaders, subject leaders and teachers in secondary schools

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Teaching repertoire

department for
education and skills
creating opportunity, releasing potential, achieving excellence

How to use this study guide

This study unit offers some practical strategies that teachers use to structure their own explanations and to help pupils provide clear explanations themselves. The techniques suggested are tried and tested; they draw on both academic research and the experience of practising teachers.

By working through this guide, you can build your teaching repertoire step by step, starting with strategies that are easy to implement and moving on to those that will help pupils develop their skills still further. The unit contains 'reflections', to help you reflect on an idea or on your own practice, as well as practical tips and tasks to help you consider advice or try out strategies in your classroom. There are case studies to exemplify particular points, a summary of the research and some suggestions for 'next steps' and further reading. The final page invites you to reflect on the material and to set your personal targets for the future.

You can work through this unit in a number of ways:

- Start small; choose one class to work with. Ask another teacher to help by talking through what you intend to do and to act as a mentor.
- Work with another teacher or group of teachers who teach the same class. Work together on developing your approach to explaining. After three weeks compare notes. Discuss which strategies are the most effective and why.
- Find someone to pair up with and team-teach. Design the tasks together and divide the role of teacher in the lesson between you.
- Work with a small group of teacher-researchers within your school. Use the guide to help you focus your work as a professional learning community. Record successes in your CPD portfolio.
- Identify sections of the unit that are particularly relevant to you and focus on those.

There is space in this study guide for you to write notes and responses to some of the questions, but you may also find it helpful to keep a notebook handy. For some tasks, you might want to make an audio recording or video of yourself in action so you can review your work more easily. You could add this, along with any other notes and planning that you do as part of your work on this unit, to your CPD portfolio.

The evidence of work you gather in your portfolio could count as points towards accreditation of an MA, or could support your application for membership of a professional body, such as the General Teaching Council of England (GTCE). It could also be used to support an application to reach threshold or Advanced Skills Teacher status.

You will need access to video sequence 8, Explaining, when working through this unit.

DfES 0431-2004

Explaining

Contents

Introduction

There are many things that are difficult or impossible to understand without explanation: for example, abstract concepts, events in the past or those outside pupils' direct experience. Principles, rules and important ideas are all unlikely to be discovered by pupils without assistance.

With successful explanations pupils:

- have a good visualisation and understanding of the new idea and know how it fits with their existing knowledge and understanding;
- have understood and internalised the key features of the idea so they are able to restate it in their own words;
- are able to use appropriate models and analogies in restating their ideas and explaining them to others;
- know how to proceed with their learning and what to do next.

Common issues

Explanations are often not clear because they do not include all the key features, have no clear structure, use inappropriate connectives, and may not make use of appropriate teaching aids. The explanations provided may not connect with pupils, and may not be pitched at the right level, thus leaving pupils with only a partial understanding, at best. They may not seem able to connect their learning with previous understanding, so they forget things and falter. As a result they may not be able to convey their understanding to others. If the subject-matter is not familiar then the best method of explanation may not be chosen, and in particular concepts may not be communicated appropriately because explanations only use words connected to abstract ideas and not illustrated by examples, models or analogies.

Resolving the issues

These issues can be resolved by planning explanations as part of the lesson-planning process.

You need to be clear about:

- the type of explanation you intend to provide and so which words (connectives) will help structure the explanation;
- which are the best methods of providing that explanation given the nature and maturity of the pupils;
- which characteristics of explanations help pupils connect with ideas, and which examples, models and analogies can best help them understand concepts in particular;
- how to read pupils' misunderstandings and how to respond by altering the nature of the explanation and choosing another method, perhaps relating to a different learning style;
- helping pupils visualise ideas, building pictures of concepts;
- the common pitfalls of explanation and how to avoid them;
- how you can develop pupils' own skills of explaining, why this is important and how this can help you check their understanding.

1 Purposes of explanation

Explanations vary according to their purpose. Categorising the main purposes can help you plan effective explanations. We can categorise the purposes of explanations in the following ways to help pupils understand:

- purposes and objectives of the lessons;
- processes, procedures and skills (explaining how);
- cause and effect (explaining why);
- relationships (how one factor affects another over time);
- concepts (often abstract);
- attitudes and values (involving some personal judgement).

Purposes and objectives of the lessons

It is often important to explain why things are done and what pupils are expected to achieve. These are lesson objectives and learning outcomes, and it is important to separate the two.

For example, at the beginning of a lesson it might be appropriate to say:

Music

> 'Today we are looking at different musical styles. The reason for this is that later you will use one in your own composition to reflect a particular emotion.

> What I am looking for in your composition is a clear style being used to reflect melancholy and a clear explanation of why you have chosen that style.'

Mathematics

> 'We are learning to interpret the shape of graphs. The reason for this is that later you will be asked to predict the shape of a graph that you expect to get when water cools to form ice.
>
> For top marks you will produce a sketch graph with clearly labelled axes, and be able to explain in the form of a hypothesis why you think the shape should be as it is.'

For further information see unit 1 Structuring learning.

Processes, procedures and skills (explaining how)

Performing a skill requires following a set procedure. The purpose of explaining a process or procedure is to help pupils understand how things happen or work. The emphasis is on sequence and connectives such as *first*, *next*, *then* and *finally* are important. Examples could include how to play a forehand stroke in tennis, how to play an Indian rhythm in music or how to carry out an investigation using the Internet. For complex procedures, where decisions are involved at various stages, this type of explanation could be linked with modelling. Here the teacher not only demonstrates and explains what to do but also talks out loud about the decisions that have to be made (see also unit 6 Modelling).

In geography you might explain the components and links in the water cycle with the aid of a diagram and structure your explanation in the following way:

> 'First water from the sea is evaporated by heat from the Sun, then the vapour condenses to form clouds, next …', and so on.

Cause and effect (explaining why)

These types of explanation are characterised by one thing leading to another in a causal sequence. The connective *because* is important here. It often starts with something that is observable and then seeks to explain this in terms of a number of possible causes, carefully considering evidence to support one possible cause or another. It is more difficult to explain events that are the result of a combination of factors, such as the outbreak of a war, the origins of an artistic movement or the causes of global warming. Diagrams such as consequence maps or concept maps can help these explanations, as can models and analogies. Interspersing the explanation with questions can also be beneficial.

Relationships (how one factor affects another over time)

When explaining relationships between factors we need to consider how one factor affects another, and also how one might relate to the other in terms of time. Explaining timelines for each event with diagrams may help. In other circumstances language such as: *as the … so the …* will help.

When explaining relationships *in graphs* we might say:

> 'You can see from the graph (pointing out relevant features) as the temperature increases so the rate of dissolving increases.'
>
> 'You will see that we can infer from the graph [pointing out relevant features] that as time has gone on so air travel has increased and sea travel has decreased.'
>
> 'The relationship between climate change and human activity is quite complex. First let us analyse what was happening between 1800 and 2000. Next let us analyse what scientists have found out about temperature in parts of the world between these times and then compare the two.'

Concepts (often abstract)

Concepts are defined as ideas or notions. These ideas or notions have common features that are recognisable, such as mammal or monarchy.

Concepts can be subdivided into those that are concrete, that is observable and tangible, and those that are abstract. The table below illustrates this.

	Concrete	**Abstract**
Familiar	Terms in everyday use and observable: e.g. wave (sea), trench, reptile, metal, paragraph	Terms in everyday use but not easily observable: e.g. design, democracy, health, flow (in dance), pace (in writing), erosion
Not familiar (often technical)	Terms used by specialists but observable: e.g. thermosetting plastic, gradient, ellipsis (in writing)	Terms used by specialists but not observable: e.g. urbanisation, atom, choreography, irony (in literature)

At Key Stages 3 and 4 there is a significant increase in the interaction with abstract ideas and these need particular attention. Using models and analogies supports pupils' visualisation of the concept. Examples include using layers of modelling clay to represent layers in a sedimentary rock, using long balloons to represent the guard cells around a stomata, and using a diagram of a school hierarchy to help understand the political and social hierarchy of a particular Shakespeare play.

Attitudes and values (involving some personal judgement)

In explaining an attitude or value the issue of judgement is important. This is often about opinion and is different from fact. These types of explanation, about people's values or attitudes, should feature the notion of opinion with justification, that is relating to some form of evidence. For instance when explaining the attitude of society towards the environment you might say:

> 'It is many people's opinion that we should not use green-field sites for new affordable housing because many think that there are sufficient brown-field sites to build 1- or 2-bedroom homes. Others think that … As a counter-argument some people think that …'

Task 1

Purposes for explanations — 20 minutes

Think about your own subject. Reflect on the lessons that you taught last week or will teach this week. What were the purposes of the explanations you provided? Complete the tally chart below to provide a picture of the explanations that you use in your subject across each key stage.

Type of explanation	KS3 lessons	KS4 lessons	Post-16 lessons
Purposes and objectives of the lesson			
Processes, procedures and skills (explaining how)			
Cause and effect (explaining why)			
Relationships (how one factor affects another over time)			
Concepts (often abstract)			
Attitudes and values (involving some personal judgement)			

Reflection

You will probably find that the nature of explanation you use changes over the age range.

- Is the spread across the type and age range as you expected?
- Which types of explanation do you use most?
- Which types of explanation do you use least?

Discuss with a colleague your range of purposes for explanations and whether they think you should be using more or fewer of a particular type.

2 Characteristics of good explanations

Good explanations have a number of common features. A teacher will employ any number and combination of them according to the purpose of the explanation, the nature of the topic and the learning needs of the pupils. The most common features are:

- clear structure;
- key features identified;
- dynamic opening;
- clarity – using voice and body;
- signposting;
- examples and non-examples;
- model and analogy;
- props;
- questions;
- connections to pupils' experience;
- repetition;
- humour.

Clear structure

All successful explanations have a clear and logical structure to them, using words, images and analogies that pupils understand and well-chosen examples to illustrate key features. So when starting an explanation you might first check that pupils understand the key words that will be used, then proceed through the explanation by breaking it down into distinct parts, illustrating it with an example if needed before moving on. For instance, when explaining methods for calculating with fractions, you might explain a method, illustrate it with an example, then move on to the next method, hence creating a chain of method, example, method, example, and so on.

Key features identified

When planning explanations it is important to identify those key ingredients that aid understanding. Brown and Armstrong (1984) termed these 'keys'. A key could be a central principle, a generalisation, an example or an analogy that would 'unlock' understanding. They found that teachers who were most effective explainers used more keys and more types of key than other teachers. Complex explanations, such as an abstract concept like democracy, rely on the joining together of a number of such keys. So, for instance, an explanation of democracy might include examples, an analogy, a visual depiction, comparison with other forms of government etc., and all of these components would have to be linked in a logical sequence. The trick is to recognise those features that could unlock understanding.

Dynamic opening

Explanations benefit from a start that grabs interest and attention. Wragg and Brown (2001) refer to them as the 'tease' or the 'hook'. They include the example of 'In a minute I'm going to tell you why my uncle can't eat raspberries and walnuts any more', as a tease for explaining how to avoid dental decay. They draw the parallel with radio and TV programmes which start with quirky summaries of the items to keep you listening.

The hook can be a startling fact that is not obviously connected to the topic, an unusual way of representing the topic, a personal story or a connection to pupils' lives.

When introducing an explanation on:	Possible tease or hook
plate tectonics	Soon I'm going to tell you why it might be more dangerous to holiday in San Francisco than Dallas.
size and number of molecules	Do you realise it is a strong probability that you have drunk water that was also drunk by Elizabeth I?
infinite series in mathematics	I am going to prove to you that Saint Sebastian actually died of fright (with reference to Tom Stoppard's play *Jumpers*).
twelve-bar blues in music	How many of you like xxx (a current pop song) and yyy (a different pop song)? Well you can play these and many others with just three chords – want to know how?

Clarity – using voice and body

The voice can sound monotonous and dull, or varied and engaging. There are many ways in which intonation of the voice and the use of body language can emphasise certain points and maintain pupils' interest. Varying pitch and speed, slowing down perhaps to illustrate a key point, can sometimes help. Hands can obviously be used to point, gesture and emphasise. However, minor aspects of body language can also be important, especially to visual learners.

A teacher was once challenged by his pupils to sit on his hands for the whole lesson. He accepted the challenge but gave in after ten minutes. He found that being unable to use his hands badly affected his ability to explain things; he even felt that his memory was not working properly and he could not think what he wanted to say. You might also need to be careful about body language when talking to pupils. For example, standing in front of pupils with folded arms can give rise to negative responses (see unit 18 Improving the climate for learning).

Signposting

Important parts of the explanation can be signalled with such phrases as:

- 'what is really important to understand …';
- 'we are going to go through the three stages in this process: first …';
- 'to summarise what we have been talking about …'.

This will help the pupil to recognise the key points and also to follow the sequence of the explanation.

Examples and non-examples

Examples are crucial in explanations, especially in establishing understanding of concepts or principles. Examples will help others understand a situation or idea; more than one example, linked to everyday experience, is very useful to illustrate a point. However, non-examples can be just as important in establishing the boundary of an idea or concept. So in explaining what an insect is, using the example of an ant and a bee will be important (perhaps with a visual aid), but so will the use of spiders as a non-example. There are several possible patterns for using examples in explanations:

- example, non-example, rule/definition, example;
- example, rule/definition, non-example;
- rule/definition, example, non-example.

This idea of providing pupils with examples and non-examples and asking them to work out the concept or rule, is considered to be a pedagogy in itself and is often referred to as 'concept attainment' (see unit 2 Teaching models).

Models and analogies

Using models and analogies can help pupils to grasp an idea and visualise it. For instance, a three-dimensional model using ball-bearings could illustrate the kinetic theory of matter, or a plastic bag filled with water can model a cell. An example of an analogy is using the flow of water to represent the flow of electricity in a circuit.

Models and analogies help pupils to visualise:

- objects that are too big or too small to be seen clearly; e.g. the Earth or a cell;
- processes that cannot easily be seen directly;
- abstract ideas.

It is important to make sure that pupils understand the model or the analogy being used. They also need to be involved in discussing the strengths or weaknesses of the model or analogy.

Props

A picture (perhaps from an ICT source), a concrete object or a demonstration can add to the power of an explanation as it captures attention and focuses pupils' minds. Again it is useful for visual learners. For example, a balloon is a useful resource in geography for explaining air pressure differences. Giving pupils objects they can hold and examine also helps. For example, providing each pupil with a sedimentary rock will help when explaining characteristic features of the rocks.

Questions

As can be seen in the following section on Connections to pupils' experience, asking questions can be a very important ingredient in any explanation. Although asking open questions during an explanation can slow the explanation and may take it off-course, asking questions can help the teacher monitor the pupils' understanding during an explanation and also help it to be more interactive, involving and interesting (see unit 7 Questioning). It is important to monitor understanding in explanations since misconceptions can be recognised, and dealt with by using further examples or by changing the pitch or direction of the explanation.

Connections to pupils' experience

Explanations often attempt to explain something completely new to pupils and use examples and props to aid understanding. Another useful skill is to activate pupils' prior knowledge so that links between the new and the old can be made and the new ideas assimilated. So for instance, if there is to be an explanation of democracy, the teacher might first of all ask pupils what they know about how governments are elected and formed in this country. Or, when explaining the concept of insects, pupils could be asked what they already know about insects and this may well lead to the teacher being able to identify the sort of terminology that the pupils use ('antenna' or 'feelers') and any misconceptions or misunderstandings that they might have.

Repetition

Allied to the use of linguistic signposts mentioned above, is the use of repetition. Repetition is an important ploy to emphasise a key point, idea or terminology. For example:

> 'The *important point* that Lady Macbeth is making here …; the *important point* is …'

Whilst infrequent in written explanations, repetition is commonplace in spoken explanations as a means of emphasis.

Humour

Humour helps to keep attention and may make some things easier to remember. For example, when explaining how to throw a ball up in the air to serve in tennis, you could add that you don't throw the ball up miles – you don't want it coming down with ice on! This adds something to an otherwise pedestrian remark.

Task 2 — Characteristics of explanations — 20 minutes

Using the observation sheet below as a prompt, identify the characteristics of explanations present in video sequence 8a. The teacher is providing explanations in a music lesson.

Which aspects of the explanations do you think particularly helped pupils develop their understanding? You may not find them all.

Subject of explanation:	
Key features identified (tick)	**What are the key points or essential elements that will help pupils understand?**
Clear structure	
Key features identified	
Dynamic opening	
Clarity – using voice and body	
Signposts	
Examples and non-examples	
Models and analogies	
Props	
Questions	
Connections to pupils' experience	
Repetition	
Humour	

Reflection

In discussion with a colleague consider whether any other ingredients could be added to make any of the explanations more effective.

You could use this observation sheet to analyse your own or a colleague's explanations.

3 Planning explanations

When planning explanations it is important to start by considering the purpose of the explanation (such as whether it is to explain cause and effect, a concept or a procedure). This will determine the ingredients that will need to be present and are particularly important, such as the need for a model if an abstract idea is to be explained. Then the sequence and structure should be planned. Most explanation sequences and structures would start with a hook or tease and finish with a summary. In between, it is for you to decide which of the main ingredients should be included, in what quantity and in which order.

You might find it helpful when you have planned an explanation to review its likely success and impact using the following checklist.

Characteristic	**Question**
Clear structure	Is the explanation structured in a logical way showing how each part links together?
Key features identified	What are the key points or essential elements that pupils should understand?
Dynamic opening	What is the 'tease' or 'hook' that is used at the start?
Clarity – using voice and body	Can the voice or body be used in any way to emphasise or embellish certain points?
Signposts	Are there clear linguistic signposts to help pupils follow the sequence and understand which are the key points?
Examples and non-examples	Are there sufficient examples and non-examples to aid pupils' understanding of a concept?
Models and analogies	What models might help pupils understand an abstract idea? Are there any analogies you could use? Will pupils understand the analogy? How might you help pupils identify the strengths and weaknesses of the analogy?
Props	What concrete and visual aids can be used to help pupils understand more?
Questions	Are there opportunities to check for pupils' understanding at various points, and to note and act on any misconceptions or misunderstandings? Are there opportunities for pupils to rehearse their understanding?
Connections to pupils' experience	Are there opportunities, particularly at the start, to check pupils' prior knowledge of the subject and to link to their everyday experiences?
Repetition	Are there a number of distinct moments in the explanation when the key points that should be learned are repeated and emphasised?
Humour	When and how might it be appropriate to use humour?

Task 3

Classroom assignment: planning an explanation — 30 minutes

Identify a future lesson from your schemes of work that will require an explanation, perhaps one that is a bit tricky.

Using the advice and the checklist above, plan the explanation. Consider how you will know whether it works or not and then test it out.

Afterwards consider:

- which aspects of the explanation worked particularly well?
- which aspects still need attention and how could you improve it further?

Task 4

Teaching and explanation — 30 minutes

Identify another lesson in the future that also involves an explanation, but one that you will teach to two different groups. This time plan the ingredients of the explanation as before but try two different approaches, perhaps one with a tease or hook and one without. Does it make a difference?

You could also try varying other aspects of the explanation, such as including examples or not and perhaps using props or not. What impact does this have on pupils' understanding?

Reflection

After the lesson, jot down your thoughts concerning how successful you thought the explanation was, and compare your views with your mentor/coach or another colleague.

4 Common pitfalls and possible solutions

Although explaining is a common feature of teaching, it is fair to say that explanations do not always lead to better understanding. This section identifies some common pitfalls of explaining and suggests some ways to avoid them.

Pupils do not appear to be interested

Consider how you may set up the explanation – what tease or hook can you use to stimulate interest? Having used the tease or hook, ask the pupils in pairs to come up with an answer to what they think you are going to explain. How long do they think the explanation will need to be? After hearing some views, start the explanation and ask them to listen carefully to find out who was right.

Explanations are overlong, pupils lose interest

You need to think in advance about the key elements of the explanation. In your initial explanation to answer follow-up questions, what points must you cover or what can you leave out? You will need to reflect about what type of explanation you are trying to give. For example, is it about a concept, an explanation of how (processes and procedures) or of why (cause and effect)? Are you using the right connectives, have you structured the explanation in this way?

In addition you need to consider the concentration span of your pupils. It has been suggested that the average concentration span corresponds roughly to chronological age plus one or two minutes. This is particularly important for challenging classes. If the explanation needs to be longer than a few minutes consider how you can break it up into parts, such as a quick explanation, followed by a break and pupil activity. For example, in pairs 'Use what I have told you so far to …' (pause) 'Can you predict the next part of what I am going to tell you?' (pause) 'In pairs, explain to your partner what I have just said in your own words. Does your partner understand, can they do better? You have 5 minutes.'

Explanations do not appear to lead to greater understanding and may create greater confusion

Before your explanation consider: do pupils know all the words you plan to use? Are they clear about why you are providing the explanation? Have you pitched it at the right level? To check for pitch you could ask pupils before you begin what they already know about the subject. You could use this as a starter activity, perhaps asking pupils to work in small groups (such as 3s or 4s) and come up with their ideas in about 3 minutes, then take feedback from some. You can then adjust your explanation to fit, introducing any new words before you begin. You will also need to consider what examples you can use to illustrate the explanation; and how to structure the explanation, such as explain a point, provide an example, explain another point, provide an example etc. Clarity of explanations is aided when there is a clear structure, language is understood and examples illustrate points.

Explanations of concepts that only involve talk

A key feature of the secondary curriculum is the introduction of increasingly abstract ideas. We tend to think about abstract ideas by turning them into pictures; we often call this visualisation. This point was made by Stephen Hawking in his book *A brief history of time* where he commented that we do not think in abstract terms, rather we turn these ideas into models and pictures in our heads so as to understand the idea. The problem with using these to explain an abstract idea is that you cannot assume the models you have are the same as the ones that others have. This is often not the case, so great care has to be taken when talking about models and analogies. It is much better to use something visual or analogies that are familiar to pupils. A key issue is enabling pupils to see something rather than just talking about it.

Explanations do not allow for checking of pupils' developing understanding

Explanations that provide information without checking on understanding are usually inefficient. Building in points for checking understanding can improve efficiency. For example, you could intersperse your explanation with questions that could check on understanding to date or you could ask one pupil to explain the idea back to you. Alternatively, you could ask pupils to 'traffic-light' their understanding, providing them with different coloured flash cards (red, amber, green) that they hold up at various stages to indicate their level of understanding.

Providing explanations that are unnecessary

Sometimes pupils lose interest in an explanation. This may be because parts (or all) of it are unnecessary. This can happen when explaining to pupils what to do at the beginning of an episode of a lesson where you are describing how to complete a task. Another cause of loss of interest is that the explanation was planned on the basis of the lowest common denominator, so that everyone understands. You may find it more efficient to explain a task more briefly for all pupils then spend some time with those who need more support.

Reflecting on a planned explanation can help you decide if you need to do it at all. Is there a better way of helping pupils understand something? For example, if you wanted to explain the concept of mammal, you could do it by providing examples and non-examples of mammals and asking pupils to build the concept for themselves. This is often referred to as 'concept attainment' (see unit 2 Teaching models).

Not treating pupils' questions seriously

Pupils may interrupt an explanation by asking you questions about what you are just about to cover, and so you ignore the question. In this case it might be helpful to plan for periods where you can pause to invite questions. You could first set out what you want to explain (the key ingredients). You could signal at the start that you will take questions at particular points by saying 'I will explain three points first and then pause and ask for questions'.

If pupils do ask questions it is important to acknowledge them, saying 'Thank you for that question, that is an interesting idea. I will deal with that now/later', or 'That is just what we are to move to next'. Even if the question is 'off beam' it is important to acknowledge it as a justifiable query and deal with it in some way.

Reflection

Look again at the pitfalls and think about your own teaching.

Which of these pitfalls have you encountered during recent lessons?

What will you do now to avoid them in future?

5 Developing pupils' explaining skills

Explaining is a valuable skill but it is also a powerful learning strategy. As Wragg and Brown (2001) point out, when pupils learn to explain a concept to another pupil it serves two important functions:

> *The first is that the child practises clear communication and thinks about the audience …; the second is that explaining to someone else can often clarify your own ideas or reveal what it is you do not fully understand.*

Extract from *Explaining in the Secondary School*, Wragg and Brown, (2001) Routledge Falmer. © Taylor and Francis Group plc. Used with permission.

Whilst not expecting most pupils to develop the sophisticated skills of their teachers, if you want pupils to explain to one another you should help them understand the basics of planning and structuring an explanation and also the main ingredients of an explanation that they can choose from. Perhaps one of the most effective ways of doing this would be for you to model planning an explanation and then provide them with a checklist similar to that on page 11. They can use this to try to spot the ingredients in a short explanation (perhaps about explanations!) that you give.

Task 5

Identifying opportunities for pupils to provide oral explanations — 30 minutes

- Select a year group and consider the scheme of work for the next six weeks.
- Make a list of the times when pupils will be asked to give an explanation.
- Add to that list the support you normally provide for pupils who are to give explanations, e.g. key terms.
- Now reconsider the scheme of work. What further opportunities might there be to develop pupils' explaining skills?
- Build these opportunities into a revised scheme of work.

Task 6

Classroom assignment: pupils' explaining skills — 30 minutes

Select a class to work with over the next three tasks.

How good are your pupils' explaining skills? Plan a lesson to find out.

You could select an explanation you want pupils to provide to each other. Ask them to work in threes: one pupil provides the explanation, the other receives it and the third listens and assesses clarity and whether or not the explanation made sense. Roles can then be changed and repeated. This can be followed by a discussion that will allow you to make a judgement of their skills.

Task continues

Alternatively you could:

- sit two pupils back to back on chairs;
- give one pupil a small model made of about eight building blocks;
- give the other pupil a box of twenty building blocks pieces including those in the first model;
- the first pupil explains to the other how to replicate the model – but only using words, nothing must be shown.

You can make a judgement about how effective these skills are by looking at the state of the finished product.

Reflection

After the pupils have had an opportunity to try out an explanation, jot down your thoughts as to how well they seem to have understood how to explain. How might you guide groups or individuals to improve their explanations in future?

Connectives in explanations

One distinct feature of all explanations is structure and knowing which connectives to use: *such as, because, since, in order to, as a result of, and so, therefore, by, if … then* and *the more the … the more …* can all help to organise an explanation.

Task 7

Scaffolding an explanation — 15 minutes

- Watch video sequence 8b. Here the teacher asks pupils to explain to each other how they went about composing a piece of music. How does he support pupils in structuring their explanations?
- Reflect on the time you have asked pupils to explain ideas. How have you helped them structure their explanations?

This table or a similar one can be displayed as a verbal scaffold to help pupils structure their explanations.

Type of explanation	**Useful connectives**	**Example of this type**
Concept	so and so therefore because in order to	Position of verbs: *German positions the verb at the end of a sentence. Therefore the verb can be some distance from its subject. So when translating into English you must look at the end of the sentence in order to get the idea you need to turn into an active English verb.*
Cause and effect	when because however this makes this causes as a result	How to blind bake: *When you line the dish with pastry put dried beans on top of the pastry. This makes the pastry behave as if there was a filling because the beans hold the pastry in place. However, the beans do not become part of the pastry because …*
Procedures	first of all next then take care to after that I did this by finally	How to cut a piece of metal rod: *First select the correct material and diameter of rod. Next get a hacksaw from the rack. Take care that the blade is in the hacksaw correctly. After that measure and mark the length to be cut with a scribe. Finally cut through the rod with even strokes.*
Processes	first next then as a result of repeated finally	The process of erosion: *First the rain gets into a small crack in the rock. Then the water freezes as a result of a drop in temperature. Water expands when it freezes. This results in the crack widening. This can happen again and again until finally the rock breaks. The rock can then fall into a river and …*

Table continues

Relationships 1	The shape of the … As … goes up/down the … goes up/down as well. increases/decreases There is inconsistency in … The more the … the more …	Information from graphs: *When the material is liquid the shape of the graph goes down quickly meaning it is cooling. When the material starts to solidify the slope of the graph decreases meaning that it stops cooling down.*
Relationships 2	has (this feature) but … When you use this … in conjunction with …	Why spiders aren't insects but flies are: *Spiders are small and look similar to flies. Spiders have eight legs and only two parts to their body but flies have six legs and …*

In any situation where we are expecting pupils to engage in discussion with each other, be it feeding back in peer assessment or in providing explanations, it is better to scaffold their first attempts. Given the importance of pupils learning to provide explanations, paying attention to the teaching of this skill explicitly will pay dividends and will lead to raised achievement.

Knowing the right words to structure the explanation is not the only way to improve pupils' explanations. They will need help in identifying:

- key vocabulary;
- key features that must be included;
- good examples to illustrate points;
- the best models or analogies to help illustrate abstract concepts and some processes.

Providing pupils with a checklist, together with the list of connectives they need to use, can also help. However, the checklist will need to be explained. Such a checklist might be as follows.

Checklist for success

- Are you clear about the type of explanation you are providing?
- What connectives will you use?
- Which key ideas do you need to mention and are they in a logical sequence?
- Which examples or props will you use to illustrate the ideas?
- Make sure you have the right sequence.

Task 8

Classroom assignment: improving pupils' explaining skills — 1 hour

Plan a session when you will explicitly teach pupils to improve their explaining skills.

- Select which type of explanation you will want them to produce.
- Provide pupils with a form of the table and checklist that will help.
- Model the process of planning an explanation.
- Provide time for pupils to plan their explanation, perhaps in pairs.
- Listen to the pupils' explanations, noting how often any connectives are used, which examples and any props that are used to improve clarity and flow. Note who does what.
- Now arrange a plenary session. Use your information to draw out ideas from the pupils about how this improves the quality of their explanations and how this could be further improved.

Summary of research

Explaining can be defined as 'giving understanding to another person'. Explanations by teachers are a common feature of lessons in all subjects. The skill of explaining is rated very highly by pupils and points out that studies have shown that from a list of teaching skills explaining clearly was placed first. Smith and Meux (1962), who looked at teaching 'episodes', found that explaining was one of the three most common teacher activities, taking about one-eighth of teachers' time. They also found that greatest confusion to children was caused by lack of precision in teachers' questions during an explanation.

Researchers have attempted to categorise explanations. suggested three categories of concepts, procedures and rules, whilst Wragg and Brown (2001) take a broader view, identifying seven main types, namely concepts, cause and effect, procedures, purposes and objectives, relationships and processes. The suggestion is that if you are clear about the type of explanation you are using, then this will help you to select the ingredients you need to include in your explanation. The type will also give you an indication of how best to structure it and the types of word connective to use.

Skilled explainers use common characteristics or ingredients. What in this unit has been termed key features, Brown and Armstrong (1984) termed 'keys' and found that teachers who were most effective explainers were clear about what keys to use and generally used more types of key than other teachers. These keys may be thought of as central principles or generalisations that must be present to unlock understanding. They also found that good explainers made pupils engage more with higher levels of thinking. The use of voice is also cited as an important characteristic, using variation in pitch, loudness and speed to stress and emphasise particular points. Gesture is also recognised as an important aid to explanation, for instance using gesture to indicate size. A clear structure is important in any explanation. Sometimes, as Wragg and Brown (2001) point out, you need to present ideas in a logical sequence where pupils often need to understand one point before moving on to the next. One characteristic identified in all these sources is a clear opening which includes an 'advance organiser' (Ausubel 1960). Put simply, this means telling pupils what is going to be explained and how, explaining it to them, then telling them what you have explained. Wragg and Brown (2001) also suggest beginning with a 'tease' or 'hook' to capture interest. The use of questioning, drama and role-play, and the use of teaching aids, are also included by many as common characteristics of good explanations.

The use of model and analogy is crucial to the explanation of many abstract concepts, and processes and procedures that cannot easily be seen such as geological formation of rocks. The importance of illustrating the strengths and limitations of models cannot be overestimated. Show that learners' and experts' views of models differ and this can lead to many misconceptions. They suggested some activities which might help pupils develop their understanding of models and of the target concepts. This includes providing learners with experience of using models to solve problems. The model can then become a tool of enquiry and not a package of facts. Another strategy is to provide multiple models of the same phenomenon. This can be helpful as concepts, such as atoms and molecules, are refined with increasing experience of their use.

References

- Ausubel, D. (1960) 'The use of advance organisers in learning and retention of verbal material'. *Journal of Educational Psychology* 51, 267–272.
- Brown, G. A. and Armstrong, S. (1984) 'Explaining and explanations'. In G. A. Brown and E. C. Wragg (eds) (1993) *Explaining*. Routledge.
- Smith, B. O. and Meux, M. O. (1962) 'A study of the logic of teaching'. In G. A. Brown and E. C. Wragg (eds) (1993) *Explaining*. Routledge.
- Wragg, E. C. and Brown, G. A. (2001) *Explaining in the secondary school*. Routledge Falmer. ISBN: 0415249562. (First published as *Explaining* in 1993 by Routledge.)

Next steps

This unit has explored an aspect of teaching and learning. You may wish to develop your ideas further, to consolidate, apply ideas in different contexts or explore an aspect in more depth and innovate.

Reflect

What have been the key learning points for you?

What has been the impact on pupils?

Here are some suggestions as to how you may develop practice further:

- For a GCSE course identify the big concepts (key ideas) that pupils must grasp in order to understand the subject. Consider how these might best be explained using the suggestions in this unit. With a colleague, plan two of these explanations, teach them and evaluate the impact. How effective were they?
- Investigate what pupils think inhibits their ability to explain ideas and what support they need. This could be carried out through discussion with a class or groups or by using a questionnaire.
- Construct a series of lessons over a period of six weeks that are explicitly designed to improve pupils' explaining skills. After the period evaluate the change produced. How much have pupils improved?
- Review the types of explanation required in your subject, either in Key Stage 3 tests or in GCSE examinations. Which types predominate? Is sufficient time given to developing the skills needed for these types? Does the textbook you are using promote these skills and match the demand of the test or examination papers?
- In the light of your findings of pupils' explanations, and the work you have done in this unit, review the balance of your lessons devoted to teacher and pupil explanation. Is there too much teacher explanation at the expense of pupil explanation?

For further reading, the following publications are recommended:

- Brown, G. and Hatton, N. 'Explanations and explaining'. In T. Kerry (2002) *Explaining and questioning*. Nelson Thornes. ISBN :0748768599.
- Wragg, E. C. and Brown, G. A. (2001) *Explaining in the secondary school*. RoutledgeFalmer. ISBN: 0415249562.

Setting future targets

Having considered your next steps, you may wish to set yourself some personal targets to support your own continuing professional development. You could use these ideas to inform your performance management discussion.

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Task 9

Setting your targets **40 minutes**

When setting targets for the future you may want to discuss the possibilities with a colleague or your line manager.

Whatever you decide to do, you will need to consider the following.

- What are your objectives for the next year?
- What are the expected outcomes in terms of pupils' achievements?
- What strategies will you employ to achieve these outcomes?
- How will you track progress over the year?
- How will you know whether you have been successful or not?

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